

HOLMES STEM ACADEMY

Outlet Sampling and Plumbing Assessment Recommendations

6602 Oxley Drive, Flint, Michigan 48504



BACKGROUND INFORMATION

On Friday, December 11, 2015, the Department of Licensing and Regulatory Affairs (DLARA) and the Department of Environmental Quality (DEQ) conducted an assessment of the plumbing system at Holmes STEM Academy to gain a comprehensive understanding of how water moves through the building and what types of plumbing materials are used. The assessment identified the following potential sources of lead leaching into drinking water:

- Lead solder joints on copper piping
- Brass valves and brass fittings
- Brass components in fixtures
- Galvanized piping

The assessment also identified a total of 44 faucets or fountains that provide water for drinking, cooking and/or food preparation. One fountain was not assessed. The DEQ and the DLARA Team (Team) developed a sequence for sampling the faucets/fountains based on how water travels through the school building.

On Saturday, December 12, 2015, the Team completed sampling of 43 faucets/fountains in the Holmes STEM Academy in the order determined by the plumbing assessment from the previous day, following a stagnation period of over 12 hours. At each of the 43 faucets/fountains identified, the Team collected four samples. Two initial, 125-milliliter samples (P1 and P2), were collected immediately after turning on the tap. The water was then flushed for 30 seconds and a third, 125-milliliter sample (F01) was collected. Finally, the water was flushed for another two minutes, and the fourth 125-milliliter sample (F02) was collected. These samples were used to determine the impact of any lead sources in and around each specific faucet/fountain and its connecting plumbing.

One fountain was out of service and could not be sampled:

- Bubbler fountain in Green Hallway near Girls Bathroom (No Site Code)

The Team then completed consecutive sampling at five of the 43 faucets/fountains in the Holmes STEM Academy. This consecutive sampling was used to determine the impact of any lead sources located deep in the supply plumbing of the school building. The five sites comprised of one site near the building service line, one site near the mid-point of the supply line, and three sites representing end points of the supply line in various corridors of the school. At each of these five sites, staff collected 10, 1-liter samples. The 10 samples were collected immediately after turning on the tap, and consecutively, without any flushing time in between.

WATER SERVICE INFORMATION

A six-inch diameter cast iron water service line enters the boiler room. The boiler room is located on the south side of the building. A three-inch galvanized water supply line runs from the meter. Three cold water supply lines exit the boiler room. One line serves areas by the gymnasium and auditorium on the east side of the school, a second line serves the kitchen and cafeteria areas, and a third line runs through a tunnel to supply the remaining parts of the school. Within the tunnel, this supply line reduces to two and one-half inch diameter copper pipe.

Outlets with Lead Levels Greater Than 15 Parts per Billion

The DEQ recommends school facilities take action if samples from any drinking water outlets show lead levels greater than 15 parts per billion. Based on the sampling conducted at 43 faucets/fountains on December 12, 2015, 14 drinking water outlets had lead water level results greater than 15 parts per billion. Listed below are those 14 outlets plus an additional outlet, due to the drinking fountain configuration. These 15 outlets are listed below with their sample results, including a description of the potential source(s) of lead, and recommended actions to be taken by the school.

Outlet: Bubbler Fountain (01DW001)

Location: Boys Locker Room, North Wall

Results: P1= 17 parts per billion, P2= 12 parts per billion
F01= 5 parts per billion, F02=5 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. The bubbler is chrome-plated brass. The connecting piping to the unit also contains some brass components, including brass fittings and a brass valve.

Replacement of this bubbler and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.



Outlet: Bubbler Fountain (01DW002)

Location: Girls Locker Room, South Wall

Results: P1= 18 parts per billion, P2=9 parts per billion
F01=9 parts per billion, F02=4 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. The bubbler is chrome-plated brass. The connecting piping to the unit also contains some brass components, including brass fittings and a brass valve.

Replacement of this bubbler and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.



Outlet: Bubbler Fountain (01DW004)

Location: Hallway Across from Girls Locker Room, West Side

Results: P1=16 parts per billion, P2=4 parts per billion,
F01=3 parts per billion, F02=2 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. The bubbler is chrome-plated brass. The connecting piping to the unit also contains some brass components, including brass fittings and a brass valve.



Replacement of this bubbler and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Bubbler Fountains (01DW006, 01DW007, 01DW008, 01DW009)

Location: Cafeteria, South Wall

01DW006

Results: P1= 22 parts per billion, P2=20 parts per billion
F01=5 parts per billion, F02=4 parts per billion

01DW007

Results: P1=15 parts per billion, P2=5 parts per billion
F01=4 parts per billion, F02=4 parts per billion

01DW008

Results: P1=47 parts per billion, P2=8 parts per billion
F01=6 parts per billion, F02=17 parts per billion

01DW009

Results: P1=22 parts per billion, P2=16 parts per billion
F01=13 parts per billion, F02=8 parts per billion

These results suggest that while the highest contribution of lead may be from the bubblers themselves, sample F02 for bubbler 01DW008 shows additional sources of lead deeper within the supply plumbing. The bubblers are all constructed of chrome-plated brass. Connecting plumbing contains brass connections, brass fittings, brass shut-off valves, and copper piping with lead solder.

Replacement of these bubblers and their connecting plumbing will significantly reduce lead exposure at this location. Further investigation of the supply plumbing in this area is also recommended. If investigation



and replacement is not currently feasible, **SHUT OFF THESE BUBBLER FOUNTAINS AND DO NOT USE FOR DRINKING OR COOKING.**

Outlet: Bubbler Fountain (01DW014)

Location: Room B109, West Wall

Results: P1=18 parts per billion, P2=2 parts per billion
F01=non-detect, F02=non-detect

These results suggest the highest contribution of lead may be from the bubbler itself. The bubbler is constructed of chrome-plated brass, with a brass connection on the underside of the sink. The connecting piping to the unit also contains some brass fittings.



Replacement of this bubbler with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Bubbler Fountain (01DW018)

Location: Room B102, North Side of Room

Results: P1=59 parts per billion, P2=35 parts per billion
F01=20 parts per billion, F02=4 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. The bubbler is chrome-plated brass. The connecting piping to the unit also contains some brass components, including brass fittings and a brass valve.

Replacement of this bubbler and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.



Outlet: Bubbler Fountain (01DW31)

Location: Community Room, West Wall

Results: P1=19 parts per billion, P2=77 parts per billion
F01=4 parts per billion, F02=3 parts per billion

These results suggest the highest contribution of lead may be from the bubbler and its connecting plumbing. The bubbler is constructed of chrome-plated brass and has a brass connection on the underside of the sink.



Replacement of this bubbler and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Classroom Faucet (01CF32)

Location: Community Room, West Wall

Results: P1=34 parts per billion, P2=15 parts per billion
F01=4 parts per billion, F02=4 parts per billion

These results suggest the highest contribution of lead may be from the faucet and its connecting plumbing. This faucet is an Elkay model that contains a brass mixer fitting on the underside of the sink to connect hot and cold water lines.



Replacement of this faucet and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

This faucet also has an aerator/screen at the outlet. If the faucet is not replaced, the aerator/screen should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator/screen should be periodically checked and cleaned.



Outlet: Kitchen Faucet (01KC033)

Location: Community Room, South Wall

Results: P1= 700 parts per billion, P2=181 parts per billion
F01=10 parts per billion, F02=2 parts per billion

These results suggest the highest contribution of lead may be from the faucet and its connecting plumbing. This faucet is an Elkay model, with a brass mixer fitting on the underside of the sink to connect hot and cold water lines.



Copper results for sample P2 at this location were also at levels above which the DEQ recommends school facilities take action. Copper results suggest these same brass components are contributing to this condition.

Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead and copper exposure at this location. If replacement is not currently feasible, sample results indicate

that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

This faucet also has an aerator/screen at the outlet. If the faucet is not replaced, the aerator/screen should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator/screen should be periodically checked and cleaned.

Outlet: Kitchen Faucet (01KC34)

Location: Community Room, South Wall
Results: P1=21 parts per billion, P2=10 parts per billion
F01=3 parts per billion, F02=1 part per billion

These results suggest the highest contribution of lead may be from the faucet and its connecting plumbing. This faucet is an Elkay model, with a brass mixer fitting on the underside of the sink to connect hot and cold water lines.



Replacement of this faucet and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

This faucet also has an aerator/screen at the outlet. If the faucet is not replaced, the aerator/screen should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator/screen should be periodically checked and cleaned.

Outlet: Kitchen Faucet (01KC037)

Location: Supply Room, North of Community Room, East Wall
Results: P1= 32 parts per billion, P2=31 parts per billion
F01=8 parts per billion, F02=2 parts per billion

These results suggest the highest contribution of lead may be from the faucet and its connecting plumbing. The connecting piping to the unit also contains some brass components.



Replacement of this faucet and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

This faucet also has an aerator/screen at the outlet. If the faucet is not replaced, the aerator/screen should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator/screen should be periodically checked and cleaned.

Outlet: Bubbler Fountain (01DW042)

Location: Off of Green Hall, next to Boys Restroom

Results: P1=24 parts per billion, P2=17 parts per billion
F01=4 parts per billion, F02=3 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. The bubbler is chrome-plated brass. The connecting piping to the unit also contains some brass components, including brass fittings and a brass valve.

Replacement of this bubbler and its connecting plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.



Outlets with Copper Levels Greater Than 1.3 Parts per Million

The DEQ recommends school facilities take action if samples from any drinking water outlets show copper levels greater than 1.3 parts per million. Based on the sampling conducted at 43 faucets/fountains on December 12, 2015, the following two additional drinking water outlets had copper water level results greater than 1.3 parts per million, but lead water level results less than 15 parts per billion. These outlets are listed below with their copper sample results, including a description of the potential source(s) of copper, and recommended actions to be taken by the school.

Outlet: Kitchen Faucet (01KC010)

Location: Room B110, East Wall

Results: P1=0.16 parts per million, P2=1.32 parts per million
F01=0.09 parts per million, F02=0.07 parts per million

These results suggest the highest contribution of copper may be from the faucet and its connecting plumbing. This faucet is an Elkay model that contains a brass mixer fitting on the underside of the sink to connect hot and cold water lines. Copper results suggest these brass components are contributing to this condition.



Replacement of this faucet and its connecting plumbing is recommended and will reduce copper exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for

three minutes following periods of stagnation is likely to reduce copper concentrations and copper exposure.

This faucet also has an aerator/screen at the outlet. If the faucet is not replaced, the aerator/screen should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator/screen should be periodically checked and cleaned.

Outlet: Kitchen Faucet (01KC029)

Location: Room B114, East Wall

Results: P1=0.13 parts per million, P2=1.66 parts per million
F01=0.10 parts per million, F02=non-detect



These results suggest the highest contribution of copper may be from the faucet and its connecting plumbing. This faucet is an Elkay model, with a brass mixer fitting on the underside of the sink to connect hot and cold water lines. Copper results suggest these brass components are contributing to this condition.

Replacement of this faucet and its connecting plumbing is recommended and will reduce copper exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for three minutes following periods of stagnation is likely to reduce copper concentrations and copper exposure.

This faucet also has an aerator/screen at the outlet. If the faucet is not replaced, the aerator/screen should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator/screen should be periodically checked and cleaned.

Outlets with Lead Levels 15 Parts per Billion or Less

While the remaining 26 outlets showed sample results to be at levels requiring no further action for lead or copper, several recommendations have been identified.

The fourth sample (F02) at all 26 outlets – following approximately three minutes of use and flushing at a reduced flow – resulted in reduced lead concentrations four parts per billion or less. This indicates that flushing at these taps used for drinking, cooking, and/or food preparation for four minutes following periods of stagnation will further reduce lead exposure. It is recommended that an operational flushing procedure be developed for use by staff responsible for plumbing operations and maintenance with emphasis on flushing after weekends and holidays.

Twenty-one of these 26 outlets are comprised of similar materials as the outlets listed above and could potentially experience higher lead levels under extended periods of stagnation. These faucets/fountains include:

- Bubbler Fountains: Hallway across Girls Locker Room (01DW003), Room B110 (01DW012), Room B102 (01DW019), Room B105 (01DW023), Room B114 (01DW027), Hallway across Community Room (01DW035), Yellow Hall near Girls Restroom (01DW038), and Red Hall near Boys Restroom (01DW039).
- Classroom Faucets: Room B110 (01CF013), Room B109 (01CF015), Room B102 (01CF020), Room B105 (01CF024), and Room B114 (01CF028).
- Kitchen Faucets: Room B110 (01KC011), Room B109 (01KC016), Room B109 (01KC017), Room B102 (01KC021), Room B102 (01KC022), Room B105 (01KC025), Room B105 (01KC026); and Room B114 (01CF030).

Replacement of these fixtures with lead-free materials is also recommended.

The bubbler fountain in the Green Hallway near the Girls Bathroom, identified at the beginning of this document as out of service should be sampled prior to placing the unit back into service, or replaced with lead-free materials.

The remaining five outlets showed sample results of 15 parts per billion or less, requiring no further action or additional recommendations.

- Kitchen Faucet: Kitchen next to cafeteria, South Wall (01KC005), and Main Office, East Wall (01KC036)
- Water Coolers: Red Hall, East Wall (01WC040 and 01WC041); and Blue Hall, East Wall (01WC043)

Consecutive Sampling Results and Building Plumbing Recommendations

The consecutive samples taken on December 12, 2015, at five sites in the Holmes STEM Academy to provide additional confirmation that the highest contribution of lead appears to be from the individual faucet/fountains and not from the larger diameter supply plumbing within the school building.

An operational flushing procedure may further reduce lead contributions from this supply line caused by stagnant conditions related to its use. Routine flushing of the plumbing that branch of the larger diameter main line (for example in the Cafeteria, the Community Room and Supply Room) should be performed on a regular basis. Even if the identified outlets are replaced, the cafeteria, community room and supply room outlets may still benefit from a flushing procedure to further reduce lead contributions and other effects of stagnant water in this cold water line.

Results of the consecutive sample monitoring are listed in the table below.

Consecutive Sample No.	1	2	3	4	5	6	7	8	9	10
LOCATION	LEAD RESULT (PARTS PER BILLION; ND = NOT-DETECTED)									
Kitchen Kitchen Faucet (01KC005)	2	3	ND	ND	ND	ND	ND	ND	ND	ND
Room B105 Classroom Faucet	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Community Room Classroom Faucet (01CF032)	14	2	2	2	1	1	1	1	1	1
Red Hall Water Cooler (01WC041)	1	1	1	1	1	ND	ND	ND	ND	1
Blue Hall Water Cooler (01WC043)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND